

DRAFT LWG RESPONSES TO EPA'S PROPOSED DREDGE DEPTH APPROACH FOR THE REVISED FEASIBILITY STUDY

The U.S. Environmental Protection Agency (EPA) provided a memorandum dated May 16, 2014, to the Lower Willamette Group (LWG) on May 21, 2014, regarding "Proposed Dredge Depth Approach." This memorandum was discussed at the May 22, 2014 Feasibility Study (FS) technical meeting. EPA indicated at that time it was considering limiting the use of the proposed approach to a comparison of the dredge depths using the remedial action levels (RALs; similar to the draft FS dredge depth approach). The comparison would help determine if the RAL approach is adequate for the revised FS. EPA indicated that it was unlikely the May 16 memorandum approach would be used to determine the actual dredge volumes for detailed alternatives evaluation for the revised FS. EPA also indicated the existing FS data set is adequate to assess depths of impact at an FS-level of analysis, and additional data will likely be collected during remedy design to establish final depths of impact.

The LWG has prepared preliminary responses and observations to the approach presented in the May 16 memorandum, which are contained herein. In summary, the LWG primary responses are:

- EPA's "Proposed Dredge Depth Approach" should not be used to develop volumes for the detailed alternatives evaluation in the revised FS. The LWG supports the continued use of RALs to determine dredge depths and alternative volumes as a realistic and feasible FS-level determination.
- The Table 1 "dredging rules" in EPA's memorandum are overly complicated for the revised FS, will not accurately reflect future decisions made in design, and should not be used in the revised FS. Instead, the selection of technology combinations within each dredge area should be determined during design.

GENERAL RESPONSES

Regarding the general approach presented in the May 16 memorandum, the LWG has the following preliminary responses:

1. We agree that the "Proposed Dredge Depth Approach" should not be used to develop volumes for the detailed alternatives evaluation. The LWG supports the continued use of RALs to determine dredge depths and alternative volumes as a realistic and feasible FS-level determination.
2. The May 16 memorandum does not indicate the comparative nature of the evaluation; EPA only discussed this aspect orally at the May 22, 2014 meeting. The May 16 memorandum should not be used beyond the comparative analysis context discussed on May 22.
3. The May 16 memorandum describes the approach but does not describe the rationale behind the approach. Even if this approach is used only as a

comparative analysis (or similar), **the rationale for the assumptions and decisions described in the memorandum should be explained.**

4. The May 16 memorandum discusses dredge depths, which is one issue. It also discusses how the dredging technology could be applied in combination with other technology options, including the following: dredge and cap combination technologies, backfill after dredging, post dredge sand or gravel “beach mix” cover of various depths, and post-dredge engineered capping. **The dredge depth issue and combination technology options issues should be clearly separated to better convey the rationale behind decisions for each issue.**

DREDGE DEPTHS

5. EPA indicated the depth of impact (DOI) for this comparative evaluation will be based on human health and ecological preliminary remediation goals (PRGs), E RALs for select contaminants of concern (COCs), and five times the B RALs for key COCs. It appears, based on the May 22 meeting discussions, that the lowest sediment PRG across all remedial action objectives will be selected. Therefore, the human health PRGs will always be lower than the E RALs and five times the B RALs, and the PRGs will always identify the deepest DOI in any given core. It appears EPA is only using these other two criteria for the combination technology option evaluation. For clarity, **the E RALs and five times B RALs criteria should not be described as part of the DOI threshold evaluation.**
6. The LWG disagrees that PRGs should be used to determine DOI even in a comparative analysis. Many of the PRGs are too low (at or near background) to be feasibly achievable even after multiple dredge passes due to dredge residuals. Post dredge sand cover will be needed regardless of whether PRGs or RALs are used to determine DOI and therefore, using RALs will be equally effective in terms of the final surface sediment concentration achieved. It is further expected that depositing sediments from upstream of the Site will result in post-dredge surface sediment concentrations that are above the PRGs. See the LWGs June 19, 2014 Section 2 Comments (Attachment 2) for more information on the Site equilibrium levels driven by deposition of sediments from upstream of the Site.
7. Per comment 1, we disagree that PRGs should be used to determine the DOI thresholds for the revised FS alternatives. The following assessment is sufficient to inform the revised FS.
 - a. We assessed the implications of using PRGs for a DOI comparative analysis as described by EPA. Specifically, we compared the DOIs identified in each core by the following DOI thresholds: 1) draft FS approach using RALs and benthic mean quotients (MQ); 2) EPA’s proposed method of using PRGs; and 3) EPA’s proposed method but with EPA RALs for each alternative instead of PRGs. This assessment used the draft FS sediment database and the draft FS alternative footprints.

- b. Results of this analysis are shown in Table 1, which presents DOI statistics for cores within each alternative for each method. The mean DOI using RAL thresholds ranges from 5 to 6 for every alternative (B through F). In contrast, the mean DOI using PRGs as the DOI threshold ranges between 7 and 8 feet. Using PRGs as applied to the existing core data base would increase the dredge depth on average by 2 feet across the entire site, which would add considerably to the dredge volumes for all of the alternatives.
 - c. Also, the percent of cores within each alternative where the threshold was still exceeded at the bottom of the core (i.e., the core is “unbounded” relative to the threshold) was examined. Using the PRGs would mean that in 70 to 73% of cases the PRG would still be exceeded in the deepest available sample from the core, as compared to 29 to 39% of the cases using the RALs. Using the PRGs for the DOI threshold implies that there would be considerable additional volume of material that is unknown. .
 - d. **The above analysis is sufficient for EPA to understand the implications of using PRGs vs. RALs as the DOI threshold in the revised FS, and no further evaluation is needed.** Based on the above, using PRGs as the DOI threshold is not a realistic or feasible approach to determining reliable dredge volume estimates at the site.
8. EPA indicates that volumes will be assessed based on the DOIs established. The May 16 memorandum discusses contouring DOIs, assigning a DOI to each 10×10 foot pixel in the contour map, and then calculating a volume by pixel. Many factors of an FS-level appropriate volume determination are not discussed in the May 16 memorandum. Per the draft FS, these factors include the following:
- How DOIs will be intersected with the actual areas of dredging assigned to each alternative;
 - Adjustments of volumes (e.g., impacts adjacent to or under structures and to allow stable slopes);
 - Overdredge allowances;
 - Residual pass depths or volume;
 - Engineering factors addressing the uncertainty in FS-level volume estimates (e.g., allowance for design core refinements, design prisms, and transition slopes from deep to shallow dredge cuts);
 - Or alternatively, a neatline volume ratio as previously proposed by EPA to capture the above factors.

EPA should clarify these factors to help determine whether differences in volume estimates between this approach and the draft FS approach are caused by the different DOI thresholds used or the differences in the other volume assumptions or both. If EPA pursues calculation of volumes using PRGs, **the above factors should be included in EPA’s volume calculation including an uncertainty analysis similar to the draft FS so that more accurate and realistic volumes are developed.**

9. The May 16 memorandum indicates that the Gasco database will be included in the last year) took place at Gasco.
 - a. It is unclear whether EPA intends to also include additional Arkema and River Mile 11 East (RM 11E) data in DOI and volume evaluations. It is also unclear what portions of the data available at these early action sites might be included. For example, data collection is ongoing at RM 11E, additional monitoring is proposed at Arkema, and recent additional monitoring (within the last year) took place at Gasco.
 - b. We are concerned that without a detailed plan on dataset usage, it will be difficult to track: 1) which evaluations are using the FS database and which are using additional datasets; and 2) what differences in various evaluation conclusions are caused by database differences versus technical issues. **The LWG requests a description of the intended inclusion or exclusion of the early action datasets (or parts thereof) in the DOI, volume, and all other revised FS evaluations, and how any variations in datasets used will be considered in the revised FS.**
 - c. Inclusion of new data will further confuse any comparisons between the draft FS and proposed DOIs and volume determinations. **When comparisons are made between draft FS and proposed methods, the datasets should be consistent.** (As noted previously, comparisons provided in this memorandum used the draft FS sediment database.)

TECHNOLOGY OPTIONS

10. Table 1 in the May 16 memorandum proposes some “dredging rules” that are segregated by the following:
 - Elevation: Shallow areas (less than 2 feet below mean lower low water [MLLW]), deeper navigation areas, and intermediate water depth (greater than 2 feet below MLLW).
 - Presence/absence of source material (as defined by EPA as five times B RALs)
 - Options of full removal vs. dredge and cap
 - Depth of impact and depth to source material

Although not explained, the rules appear to relate to the circumstances where combination technologies (e.g., dredge and cap, dredge and fill, and dredge and cover) would be implemented. In general, the rules appear overly complex for an FS-level assessment and not likely to anticipate specific design-level considerations and needs within each sediment management area (SMA). **This type of analysis is overly complicated for the revised FS and will not accurately reflect future decisions made in design. The selection of technology combinations within each dredge area should be determined during design.** If EPA proceeds with this for the revised FS, the EPA should use a simpler set of assumptions to provide a reasonable assessment of various FS

issues (e.g., costs) related to technology combination options, which would still provide an accurate FS-level estimate of potential future design options. The responses below indicate specific ways these assumptions could be simplified.

11. The rationale for the dredging rules needs to be closely tied to an integrated assessment related to issues of habitat value, water surface area loss, navigation needs, flood concerns, and dredge residuals control. These all appear to be issues that may be addressed by the rules, but the linkage between the issues and rules is not clear. Further, these rules need to be integrated with similar assessments for other remedial technologies (e.g., capping and enhanced monitored natural recovery [EMNR]). Examples of unclear rationales for the dredging rules are as follows:

- a. If minimizing potential flood impacts is a goal, why have rules that automatically require backfill of dredge prisms? This would result in a loss of potential additional flood capacity created by the remediation dredging. This rule also does not consider the interplay between EMNR or capping (as stand-alone technologies) and dredging so that an overall goal of minimizing flood impacts would be achieved.
- b. If minimizing loss of water surface area is a goal, in shallow areas why have rules that fill dredge prisms? This would return some shallow areas to elevations that are routinely above the water surface during lower flow conditions. Again, this rule also does not consider the interplay with capping and EMNR as stand-alone technologies.
- c. If maximizing habitat quality is a goal, why have rules in shallow and intermediate elevations that automatically return the elevation to the pre-dredge elevation? As presented in Appendix M of the draft FS, the habitat value of various water depths can be summarized as scores (see the attached Figure 1, which is an adapted version of Figure 3.2-3 from the draft FS Appendix M). Habitat quality might be better maximized by simply capping “shallow water main channel” habitat and converting it to higher value “shallow water nearshore” habitats, as defined in Figure 1. Similarly, “deep water” habitats that lie outside of navigation areas could be capped and converted to higher value “shallow water main channel” habitats. Overall, EPA’s Table 1 May 16 memorandum depth intervals and related rules appear to have no clear relationship to potential habitat values represented by various water depths, as shown in Figure 1.
- d. If maximizing habitat quality is a goal, why have rules that require changes in substrate type (e.g., application of “beach mix”) in some cases but not others? Again, the relationship to stand-alone capping and EMNR substrate issues is also not considered. Inconsistent consideration of substrate and other potential habitat features (e.g., rip-rap, overwater structures, and riparian vegetation) results in rules that could as easily diminish rather than enhance overall habitat value of any given alternative.
- e. Similarly, see comment 11 about navigation concerns.

If EPA proceeds with technology combination selection for the revised FS, the LWG will propose a framework for integrating these various issues into a simpler set of assumptions that can be used for FS-level appropriate evaluations.

12. In general, material placement (caps, backfill, etc.) in navigation areas (including future maintenance dredge areas [FMD]) needs to be more closely tied to the navigation analysis provided in the draft FS (see Figure 2, which originally appears as Figure 6.2-28 in the draft FS).
 - a. Per Figure 2, **any placed material after dredging in the navigation channel needs to account for an allowance for potential future maintenance dredging, potential future deepening, allowable overdredge, and an operational buffer such that the material would not be subsequently removed by maintenance dredging or impacted by navigation.** Similar but different requirements should be accounted for in the FMD areas as shown in Figure 2. It appears that EPA's dredge rules (such as, "dredge to 15 ft and place 3-foot sand cap") do not consider these navigation buffers.
 - b. The draft FS analysis (p. 6-49) also shows that navigation buffers and allowance for capping back needed in the navigation channel and FMD areas are approximately 16 feet and 11 feet, respectively. The analysis further shows that contamination in the navigation areas will be fully removed by dredging before these buffers are reached. Therefore, **all the dredge rules for navigation areas should be changed to "dredge to threshold and place residual sand cover."**
13. The purpose or benefit of the dredge and cap back rules are unclear.
 - a. For non-source material areas, EPA assumes that dredge/cap will involve removal of 3 feet of material and replacement of that interval with either an "engineered cap" or "sand." The need for dredging and capping is generally determined by a balance of effectiveness and cost considerations (with technical feasibility also playing a substantial role in some circumstances), such as depth to contamination, contaminant concentrations at particular intervals, slopes, nearby structures, habitat issues, and existing or future site uses. For example, dredging to 3 feet and capping back in areas with 4 feet of contamination would be cost ineffective as compared to simply dredging the additional foot of contamination. Similarly, a 3 feet cap may not always be the best design; thinner caps may be effective in some cases, and thicker caps may be needed in other cases.
 - b. There is no rationale for always assuming that 3 feet of removal followed by capping back the same interval will represent a reasonable balance of cost and effectiveness. **Given the complexity of the site and variations across SMAs relative to the factors noted previously in this memorandum, the particulars of dredge/cap combinations are best left to remedial design. Regardless, we agree that wide flexibility in applying dredge/cap combinations should be allowed for in design.**

- c. The assumption that intermediate elevation dredge/cap areas could always be covered with “sand” vs. an engineered cap appears unjustified. A similar issue exists for shallow and intermediate elevations, full removal, and DOI >15 feet, where placement of sand is specified. Clearly, there could be cases where contaminant levels in the post dredge surface or the occurrence of river currents could require more than a simple sand layer to isolate remaining contaminants. Per above, the particulars of dredge/cap combinations are better left to design.

Table 1: Implications of EPA-Proposed Dredge Depth Approach

Depth of Impact Statistic	B			C			D			E			F		
	HH_PRG	EPA RAL	Draft FS	HH_PRG	EPA RAL	Draft FS	HH_PRG	EPA RAL	Draft FS	HH_PRG	EPA RAL	Draft FS	HH_PRG	EPA RAL	Draft FS
5th percentile	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25th percentile	3	1	1	3	1	1	3	1	1	3	1	1	3	1	1
Mean	8	5	6	8	5	6	8	5	6	7	5	6	7	5	6
75th percentile	13	9	10	12	8	9	12	8	9	11	8	8	11	9	9
95th percentile	15	15	20	15	15	19	15	15	19	15	15	17	15	15	17
Percent Unbounded	71%	29%	30%	73%	31%	30%	72%	34%	32%	73%	34%	36%	70%	39%	37%
Number of Cores	103	103	103	160	160	160	177	177	177	256	256	256	375	375	375

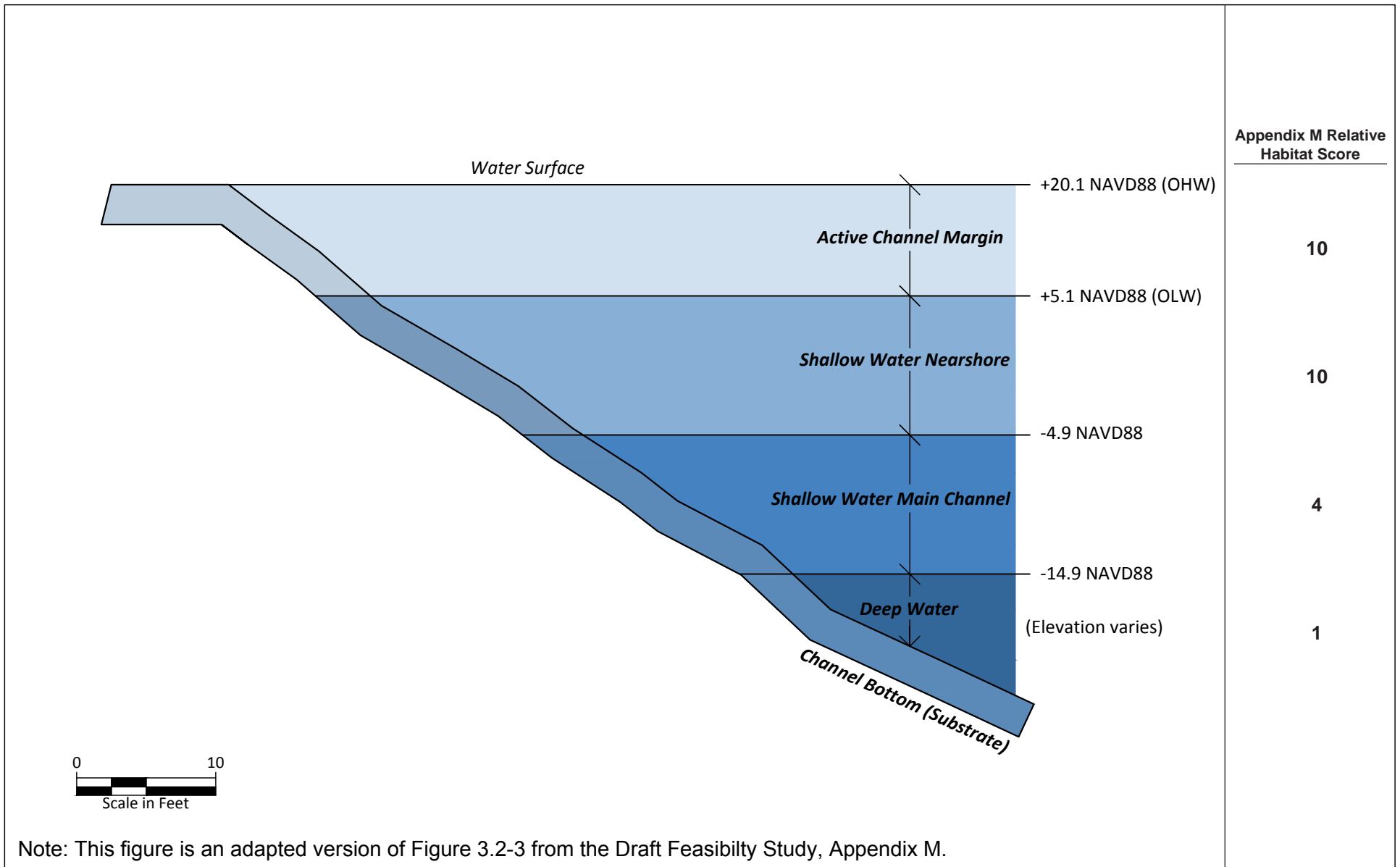
Notes:

EPA = U.S. Environmental Protection Agency

FS = Feasibility Study

PRG = preliminary remediation goal

RAL = remedial action level



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